ACTIVITY #1 -- Sketch a superhero engineer.

Don’t sketch this one… ... create your own.

Based on manufacturers' data.

Source: Vimont Toyota Laval - YouTube
Research & Development

Engineering & Manufacturing

Source: https://www.toyota.com/usa/operations/
Customer Enchantment through Design Thinking

Brad Eiben

Executive Director, MS in Product Management
Design a widget or app.

Solve your customer’s problems.
• Hands-On
• Customer-Focused
• Problem First

https://www.iconspng.com/image/46263/the-thinker-grayscale
PURPOSE

To learn a design framework and fundamental principles, with emphasis on “getting dirty,” so that we may deliver value to customers by solving their problems.
AGENDA

• About Me
• About You
• Double Diamond
• Discover
• Define
• Activity #2
• Design
• Deliver
• Q&A

Activity #3
Time Permitting
Let’s interact.

This is a broad overview.
Foundation at Toyota in lean culture.
ABOUT ME

More than 2 decades involved with new product development.
ABOUT ME

Taught HCI for Product Managers and advised on projects for two years.
ABOUT ME

Parallel problem-solving processes.

Lean Thinking

Design Thinking
ABOUT ME

Executive Director, MS in Product Management
MS in Product Management

- ~7 years average exp.
- Variety of backgrounds:
  - ½ Computer Science
  - ¼ Other Engineering
  - ¼ Business and Misc.
- Many have grad degrees
- “I’m ready to take the leap.”
ABOUT YOU
DOUBLE DIAMOND
If I had an hour to solve a problem I'd spend 55 minutes thinking about the problem and 5 minutes thinking about solutions.

— Albert Einstein —
DOUBLE DIAMOND

Problem Space

Solution Space

Iterate Throughout

Source: https://www.nicepng.com/maxp/u2t4r5q8t4a9e6u2/
DOUBLE DIAMOND – HARDWARE

PROBLEM STATEMENT

DISCOVER

DEFINE

DESIGN

DELIVER

SHIP

Source: https://www.nicepng.com/maxp/u2t4r5q8t4a9e6u2/
DISCOVER
Go see, ask why, show respect.

— Fujio Cho —
DISCOVER

Source: https://www.nicepng.com/maxp/u2t4r5q8t4a9e6u2/
DISCOVER
DISCOVER

Goals: collect data, empathize, observe

Mindset: humble, inquisitive, hands-on

Tactics:

• Interviews & Surveys
• Journey Mapping
• Competitive Analysis
• Stakeholder Mapping
When to use each?
Interview Considerations:

- Anticipate Goals
- Plan, Script, Record
- Competitive Analysis
- Types of Interviewees
- Mood and Emotion
- Genchi Genbutsu
- 5 Whys
- Journey Mapping
The user is not like me!

11/13/2016: Source: https://www.nngroup.com/articles/computer-skill-levels/
DISCOVER – GENCHI GENBUTSU

DISCOVER – GENCHI GENBUTSU
DISCOVER – GENCHI GENBUTSU
DISCOVER – 5 WHYS

WHY
• Shipment was wrong

WHY
• Tracking system error

WHY
• Scanner was broken

WHY
• IT Department didn’t respond

WHY
• Understaffed and point person on vacation
DISCOVER – JOURNEY MAPPING

Air Travel Customer Journey

Main Actions
- At home researching and ordering tickets.
- In the car, driving to the airport.
- Ticket check-in at the airport.
- Luggage check-in at the airport.
- On the airplane.
- Luggage pick-up at destination.

Emotions and Touchpoints

Thoughts
- Where do I want to go? How do I order?
- I am stuck in traffic. What happens if I miss my flight?
- I do not have time for this. I’m in a hurry!
- Is my flight on time? Did I hurry for nothing?
- I made it! Now I can relax for a while.
- I hope my luggage is not missing and is here on time.

Ideation
- A check-in app would make it possible to check-in at home or on the way to the airport, and ease stress for our customer.
- The app or another service could also notify the customer about delays and luggage status.

Source: UXPressia
INTERVIEW PITFALLS

THE CONFIRMATION BIAS

WHAT THE FACTS SAY
UNDERVALUED

WHAT CONFIRMS
YOUR BELIEFS
OVERVALUED

FOOLISH

JamesClear.com
The manager who comes up with the right solution to the wrong problem is more dangerous than the manager who comes up with the wrong solution to the right problem.

— Peter Drucker —
DEFINE

Goals: interpret, synthesize, prioritize

Mindset: analytical, collaborative

Tactics:

• Affinity Diagram
• Decision Matrix
• Personas
DEFINE - AFFINITY

https://uxplanet.org/free-sketch-template-for-building-a-meaningful-affinity-diagram-during-the-ux-process-f832e081782d
DEFINE - PERSONA

THE LIFER

I frequently use VA services and plan to continue doing so. I look to the VA to play a supporting, community building role in my life. I am grateful for my VA benefits, but I get frustrated when problems arise which break up the continuity of my care - like when my doctors change too frequently and when I can't transportation to VA facilities. Generally, I try to speak highly of the VA and want to contribute to making it work better for fellow Vets.

EXPECTATIONS

- That the VA cares and takes the time to understand my needs and story
- Cost of VA services won’t rise
- That I can reach someone at the VA anytime I need anything

NEEDS

- I don’t want to tell my story over and over, especially after using the VA for so long
- I want to know what’s going on with my services and especially my benefits
- I’d like patient, nurturing healthcare

DESIGNING FOR THE LIFER

Allow me to pause and ask questions, and to have access to a VA professional to speak with frequently and in a timely manner. Include info about local Veteran support chapters in communications. Provide me with a single online tool or a call center where they can refill prescriptions, see test results, and maintain all aspects of the VA needs. Give high level of feedback loops so that I can be assured my request was submitted and is being handled.
DEFINE - PERSONA

THE LIFER

I frequently use VA services and plan to continue doing so. I seek to the VA to play a supporting, community building role in my life. I am grateful for my VA benefits, but get frustrated when problems arise which break up the continuity of care - like when my doctors change too frequently and I can’t access my VA benefits. Generally, I try to stay high of the VA and want to contribute to making it work better for fellow Vets.

EXCEPTIONS:
- That the VA cares and takes the time to understand my needs and story
- Cost of VA services isn’t an issue
- That I can reach someone at the VA anytime

NEEDS:
- I don’t want to tell my story over and over, especially after using the VA for so long
- I want to know what’s going on with my services and especially my benefits
- To be patient, nurturing healthcare

THE TRANSACTIONAL

I joined the military largely based on the promise of the the opportunities it would afford me in life. I plan to use VA services to get my life on track post-service. I tend to be in the younger generation of Vets (Gen Y, Gen X, Gen Z). I am often engaged in the Veteran community, see other Veterans as allies and advocates in helping folks understand and use their benefits. But I will share my frustrations if I feel like the VA isn’t helping me as promised.

EXCEPTIONS:
- That the VA will deliver on its promises and help me access the benefits I’ve earned
- That there are benefits available to my family
- That it’s a headache, and I have to figure it out on my own with the help of my network

NEEDS:
- Accurate expectations
- Financial support at times, especially if I grow a family
- To feel I’m part of a community

THE JUST-IN-CASE

I am proud of my service, but don’t need the VA and plan an using only as a backup. Mature and organized by nature, I have all of their papers in order with the VA and have a good idea of what I am eligible for.

EXCEPTIONS:
- That I will likely never need VA benefits
- That the VA will be there for me if I need it
- That there are benefits available to my family
- Private benefits are of higher quality & greater ease

NEEDS:
- Peace of mind
- To be assured that documents are in line
- To easily get in touch with one person about one question

DESIGNING FOR THE TRANSACTIONAL

Explains VA benefits and services comprehensively and easily so that life plans can make upon quick post-service. Include lists of phone numbers, websites, resources, and why they are relevant. Auto-wrap when it’s possible. Present benefits as they relate to life events (school, GI Bill, employment, Job-related, family home loan). Visualize processes, timelines and how I should be prepared.

THE INFREQUENT

I really don’t think very much about the VA. I have used VA benefits in my lifetime, yet often years will go by between those interactions. This might be because I live in a place where it’s difficult to access VA services, because I am financially comfortable or because it seems like too much hassle. I tend to prefer quick transaction - a short phone call or a few clicks on a website.

EXCEPTIONS:
- The VA is slow - like any bureaucracy
- The VA is to “other, injured Vets who need it more”
- Someone will tell me when and if I am eligible for something

NEEDS:
- To be able to quickly navigate processes
- To be reminded every few years of how the VA might be able to help me

DESIGNING FOR THE JUST-IN-CASE

Provide ways for me to learn about and access benefits both through third parties (i.e. at the bank when securing a home loan).

I will most likely use VA services if I can see the value for my life and b) accomplish my goals in convenient, simple service offers. Offer me easy-to-use web-sites and the ability to speak with someone.

Source: Us Dept of Veteran Affairs
## DEFINE – DECISION MATRIX

<table>
<thead>
<tr>
<th>ITEM</th>
<th>IMPACT</th>
<th>FEASIBLE + RISK</th>
<th>COST</th>
<th>TIMING</th>
<th>OTHER</th>
<th>OVER ALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add / improve PPE. New mechanic style work gloves. Make sure enough equipment is available</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Add safety attitude dialogue to every safety meeting. Get employees to define and find bad safety attitudes</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Implement a safety reward program - Random raffle tickets. Monthly drawing</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Have every employee perform a department safety inspection. Do this weekly until 1 full roster rotation is completed</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Enforce disciplinary action on safety violations</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Chart department accident rates and display. Look a number of accidents VS accident rate</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Create designated walk ways through department. 3 feet wide?</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>Ergonomic assessment of the Tool room</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>Improve shop work space. Limit number of pallets in the department. Designated storage areas. Overflow area?</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>Exercise program - Stretching</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Change dress code to no shorts or sleeveless shirts.</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Setup proficiency tests for Toolmakers. Levels?</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Add new brighter lighting to department</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Make storage racks for long term mold/job storage. *Requires additional forklift added to department</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>
ACTIVITY #2
DIVERGENT THINKING
Every child is an artist. The problem is to remain an artist once they grow up.

- Pablo Picasso
The best way to have a good idea is to have a lot of ideas.

— Linus Pauling —
DESIGN

Goals: ideate, experiment, prototype

Mindset: exploratory, egoless, hands-on

Tactics:

• Prototyping
• Sketching
• “How Might We”
DESIGN - PROTOTYPING

Play Section Study (Round 1)
Source: Johny Vinoux
Jeff Hawkins, 1995

“Tested design with this model using a chopstick for a stylus.

He took pretend notes in meetings and counted the steps it took to perform common tasks.”

Source: Computer History Museum
DESIGN - SKETCHING

DESIGN – HOW MIGHT WE

https://www.youtube.com/watch?v=ry55--J4_VQ
DELIVER
Design is not just what it looks like and feels like. Design is how it works.

— Steve Jobs —
DELIVER

Goals: test, debug, launch

Mindset: critical, entrepreneurial, strategic

Tactics:

• Think Aloud Testing
• Heuristic Evaluation
• Iteration
DESIGN – THINK ALOUD

• Similar to interviews in discover phase
• Performed on your prototype
• Encourage the tester to speak as they perform tasks
DESIGN – HEURISTIC EVALUATION

10 Usability Heuristics

- Visibility of system status
- Match between system and the real world
- User control and freedom
- Consistency and standards
- Error prevention
- Recognition rather than recall
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Helps users recognise, diagnose, and recover from errors
- Help and documentation

Source: Interaction design foundation
Never give an order that can't be obeyed.

— Douglas MacArthur —
DESIGN – ITERATE

Source: https://www.nicepng.com/maxp/u2t4r5q8t4a9e6u2/
ACTIVITY #3
THINK ALOUD
Find a partner

Conduct a 5 minute think aloud

Goal is to practice encouraging the interviewee to keep talking as they complete the task

What are the nearest 15 restaurants?
Thank You...

Many ideas and much of the content in this presentation are borrowed from the faculty of CMU’s Human-Computer Interaction Institute. It is derived from the course *HCI for Tech Execs* and has been developed by Brad Myers then adapted by Laura Dabbish and Raelin Musuraca among others.

For those who find this topic interesting, *HCI for Tech Execs* would be an excellent course.